REMARKS

Applicant intends this response to be a complete response to the Examiner's **3 June 2008** Non-Final Office Action. Applicant has labeled the paragraphs in his response to correspond to the paragraph labeling in the Office Action for the convenience of the Examiner.

DETAILED ACTION

Requirement for Information under 37 CFR 1.105

The Examiner contends as follows:

> 1. Applicant and the assignee of this application are required under 37 CFR 1.105 to provide the following information that the examiner has determined is reasonably necessary to the examination of this application.
>
> In response to this requirement, please provide copies of each publication which any of the applicants authored or co-authored and which describe the disclosed subject matter of constructing an isotropic ideal window/filter using isotropic scaling functions and associated translation operators.
>
> In addition, please provide the title, citation and copy of each publication that any of the applicants relied upon to develop the disclosed subject matter that describes the applicant's invention, particularly as to developing the step of constructing an isotropic ideal window/filter using isotropic scaling functions and associated translation operators. For each publication, please provide a concise explanation of the reliance placed on that publication in the development of the disclosed subject matter.

Applicants note that the Examiner cited the latest paper by the Applicants in the area. This paper served as much of the subject matter for the present invention as this application was filed with in the year following the papers publication. Applicants are reviewing all of their publications and will provide any relevant documents found, but at this time, Applicants believe that the Examiner has the most relevant documents.

Specification

The Examiner contends as follows:

> 2. The specification is objected to because pages 26-27 contain a list of publications cited by the specification. According to the MPEP § 609 A(1) "the list may not be incorporated into the specification but must be submitted in a separate paper." Therefore, Examiner suggests Applicants file a separate information disclosure statement following the requirements of 37 CFR 1.98(b), which requires a list of all patents, publications, or other information submitted for consideration by the Office.

Applicants will gather and submit the list of references as an Information Disclosure Statement.

Claim Objections

The Examiner contends as follows:

> 3. The numbering of the claims is not in accordance with 37 CFR 1.126 which requires the original numbering of the claims to be preserved throughout the prosecution. There are two claims that are numbered as claim 3. Misnumbered claims 3-15 have been renumbered as claims 4-16 respectively.

Applicants have corrected the claim numbering problem, and request withdrawal of this objection.

4. **Claims 5-6** stand objected to under 37 CFR 1.75 as being a substantial duplicate of claims 2-3 respectively.

The Examiner contends as follows:

> When two claims in an application are duplicates or else are so close in content that they both cover the same thing, despite a slight difference in wording, it is proper after allowing one claim to object to the other as being a substantial duplicate of the allowed claim. See MPEP § 706.03(k).

Applicants have amended claims 5 and 6 to depend from newly renumbered claim 4, and respectfully request withdrawal of this objection.

Claim Rejections 35 USC § 112

5. **Claims 3 and 6** stand rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement.

The Examiner contends as follows:

> The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.
>
> Referring to claim 3, the specification is non-enabling with regards to using the method of claim 1 in (i) data compression and storage for streaming video, seismic imaging, or digital medical imaging of all types, (ii) image and signal enhancement, denoising and analysis for medical imaging, seismic imaging, satellite imaging and surveillance, target acquisition, radar, sonar, or pattern recognition and analysis, (iii) volume rendering and segmentation, or motion analysis, and (iv) as a basis for digital algorithms for solving ordinary and partial differential equations in science, engineering, economics, and other disciplines. The specification does not provide enabling support for using the method in each of the specific applications listed above. A similar rejection is also applicable to claim 6.

Applicants have sufficiently enabled the use of the filters for these purposes as Applicants have shown how to derived isotropic filters. These filters are the type of filters that are used in all of these applications. Once the mathematics associated with the construction of the windows, operators, filters and wavelets, the filters and wavelets can be used for all of these purposes as would be well known to any ordinary artisan in these fields. As an analogy, when Intel introduces a new processor, it does not have to tell everyone how one would use a process for all the used for which

a processor is used. All artisans in what ever field would know exactly how to use the processor. Such is true of new filters. Once the filters have been disclosed, ordinary artisans any whatever field can plug the filter in and away they go.

Therefore, applicants respectfully request withdrawal of this section 112, first paragraph rejection.

6. **Claims 1 and 4** stand rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The Examiner contends as follows:

> Referring to claim 1, the phrase "A method system" in line 1 renders the claim indefinite because it is unclear whether the claim is a method claim or a system claim. Because the body of the claim appears to recite steps, the Examiner will construe claim 1 as a method claim for examination purposes. Moreover, the phrase "from the isotropic ideal filters" in line 5 further renders the claim indefinite because it lacks antecedent basis. There is no previous recitation of the isotropic ideal filters. In addition, the phrase "from the filters" in line 11 further renders the claim indefinite because it is unclear which filters (filters in line 4 or filters in line 6) is being claimed. Finally, the phrase "isotropic ideal filters." in line 5 is improper because there is a period after the word filters. Appropriate corrections are required.

Applicants' attorney apologizes for the typographical errors in the claim. Applicants have amended the claim to address these problems, and respectfully request withdrawal of the rejection.

The Examiner contends as follows:

> Referring to claim 4, the phrase "A method system" in line 1 renders the claim indefinite because it is unclear whether the claim is a method claim or a system claim. For examination purposes, the Examiner will construe claim 4 as a method claim. Appropriate correction is required.

Applicants' attorney apologizes for the typographical errors in the claim. Applicants have amended the claim to address these problems, and respectfully request withdrawal of the rejection.

Claim Rejections - 35 USC § 101

7. **Claims 11-16** stand rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter.

The Examiner contends as follows:

> In particular, claims 11-16 recite subject matter that does not fall within one of the four statutory categories under 35 U.S.C. 101—process, machine, manufacture or composition of matter. Instead, claims 11-16 appear to merely recite scientific principle divorced from any tangible structure, which does not fall within the statutory classes. *See O'Reilly v. Morse*, 56 U.S. (15 How.) 62 (1854).

Applicants have amended claims 11-16 so that they now comprise statutory subject matter, and respectfully request withdrawal of this rejection.

Claim Rejections - 35 USC § 102

8. **Claims 1-11, 14-16** stand rejected under 35 U.S.C. 102(a) as being anticipated by the article entitled "Non-separable Radial Frame Multiresolution Analysis in Multidimensions and Isotropic Fast Wavelet Algorithms" by Papadakis et al. (hereinafter Papadakis).

The Examiner contends as follows:

> Referring to claims 1-11, 14-16, Papadakis discloses the claimed features on pages 1 through 8. (The Examiner notes that the Papadakis article has a publication date that is prior to Applicants' filing date of March 12, 2004, but after the provisional filing date of March 12, 2003. In order to receive benefit of the earlier provisional filing date under 35 USC 119(e) and to overcome the Papadakis article, the Applicant must show that the requirements of 112 first paragraph have been met. In particular, Applicants must show how each limitation recited in the claims are sufficiently supported by the provisional application.)

Applicants hereby antedate the reference. This article formed part of the basis for this application, which was filed less than one year from the filing date of this application. The cited reference includes most if not all of inventors of the present application. Any differences are a result of the difference between named authors (contributors to the article) and named inventors (contributors to the intellectual inventions described in the patent application).

Because this application was filed less than one year from the publication date of the reference and the article formed part of the subject matter of this application, Applicants respectfully antedate this reference and request withdrawal of this rejection.

Claim Rejections - 35 USC § 103

9. **Claims 1-2, 4, 5, 7-10** stand rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of the article entitled "A Kind of 2-D Isotropic Wavelet for Detecting Image Primitives" by Hou et al. (hereinafter Hou) and the article entitled "Periodic shift-invariant multiresolution analysis" by Bastys (hereinafter Bastys).

The Examiner contends as follows:

> Referring to claim 1, Hou discloses a method for forming multiresolution wavelets comprising the steps of:
>
> constructing isotropic ideal windows in a dimension greater than or equal to 1 [pp. 731-732, section II. Note that the windows are in two dimensions],
>
> constructing translation and dilation operators adapted to form out of the ideal windows completely isotropic low pass filters, high pass filters and filters that cover a desired frequency range

or plurality of frequency ranges from isotropic ideal filters [pp. 731-735, sections II-VI], into;

constructing filters from the ideal windows and the translation and dilation operators, where the filters are selected from the group consisting of low pass filters, high pass filters and filters that cover a desired frequency range or plurality of frequency ranges [pp. 731-735, sections II-VI];

constructing scaling functions and associated translation operators for use with low pass scaling functions; and producing associated wavelets from the filters and the scaling functions and low pass scaling functions adapted to resolve a multidimensional signal into various resolution levels [pp. 731-735, sections II-VI, particularly section IV].

Hou does not explicitly disclose that the scaling functions are isotropic. However, isotropic scaling functions and associated translation parameters for use with low pass scaling functions were exceedingly well known in the art. For example, Bastys discloses constructing isotropic scaling functions and associated translation parameters for use with low pass scaling functions [pp. 398-400 sections 1-2. Note that the Shannon scaling function is construed as isotropic scaling functions.].

Hou and Bastys are combinable because they are both concerned with multiresolution wavelet processing methods. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to modify Hou's scaling functions so that they are isotropic, as taught by Bastys. The reason for doing so would have been to enhance the flexibility of the wavelet generation process by using a scaling function that is shift-invariant [Bastys, abstract]. Therefore, it would have been obvious to combine Hou with Bastys to obtain the invention as specified in claim 1.

Hou et al. does not disclose isotropic, non-separable widows, filters, scaling functions and/or wavelets. This is abundantly clear from equations 15-17 of Hou et al. (page 73). The $H(\omega_1,\omega_2)$ and the $G(\omega_1,\omega_2)$ functions are not isotropic. Moreover, the scaling function $\varphi(\omega_1,\omega_2)$ and wavelet $\Psi(\omega_1,\omega_2)$ are not derivable from equations 10-12 using equations 16-17. Furthermore, the scaling function $\varphi(\omega_1,\omega_2)$ and wavelet $\Psi(\omega_1,\omega_2)$ are not non-separable and isotropic.

The present invention relates to the construction of isotropic filters, isotropic scaling functions and isotropic wavelets that can be used in frame multi-resolution applications and in any other application for which such filters are capable of being used.

Hou et al. did not actually create isotropic filters, isotropic scaling functions and/or isotropic wavelets. Hou et al. did not even suggest a method for constructing isotropic filters, isotropic scaling functions or isotropic wavelets.

The inclusion of Bastys does not cure the deficiencies found in Hou et al. Moreover, Bastys disclosed shift-invariant and not rotationally invariant or isotropic. Shift invariance related to time shift of the x(t) to x(t-θ), while rotational invariance or isotropic behavior means that the function does not change when the function undergoes an arbitrary rotation about a central axis. Thus, the combination of Hou et al. and Bastys does not disclose or even suggest nonseparable isotropic filters, isotropic scaling functions or isotropic wavelets

Because the combination of Hou et al. and Bastys does not disclose isotropic filters, isotropic scaling functions or isotropic wavelets or how to construct isotropic filters, isotropic scaling functions or isotropic wavelets, this combination cannot render the present claims obvious.

Applicants, therefore, respectfully request withdrawal of this rejection.

The Examiner contends as follows:

> Referring to claim 2, Hou further discloses dividing each filter into at least one relative low pass component and at least one relative high pass component [pp. 731-735, sections I-VI].

Applicants reassert their argument concerning the combination Hou et al. and Bastys. Applicants recognize that in all such application filters are designed – low, high and other types, but the Hou et al. and Bastys filters appear to be overlapping deconstructions and not non-overlapping. However, the basic problem with the Hou et al. and Bastys functions is that they are not nonseparable and isotropic. Applicants, therefore, respectfully request withdrawal of this rejection.

The Examiner contends as follows:

> Referring to claim 4, Hou discloses a method for analyzing data comprising the steps of constructing at least one wavelet including filters having at least one ideal window and necessary translation and dilation operators, where the filters are selected from the group consisting of low pass filters, high pass filters and filters that cover a desired frequency range or plurality of frequency ranges [pp. 731-735, sections I-VI].
>
> Hou further discloses scaling functions and associated translation operators for use with low pass scaling functions; and resolving a multidimensional signal into various resolution levels with the at least one wavelet [pp. 731-735, sections II-VI, particularly section IV], but does not explicitly disclose that the scaling functions are isotropic. However, isotropic scaling functions and associated translation parameters for use with low pass scaling functions were exceedingly well known in the art. For example, Bastys discloses constructing isotropic scaling functions and associated translation parameters for use with low pass scaling functions [pp. 398-400 sections 1-2. Note that the Shannon scaling function is construed as isotropic scaling functions.].
>
> Hou and Bastys are combinable because they are both concerned with multiresolution wavelet processing methods. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to modify Hou's scaling functions so that they are isotropic, as taught by Bastys. The reason for doing so would have been to enhance the flexibility of the wavelet generation process by using a scaling function that is shift-invariant [Bastys, abstract]. Therefore, it would have been obvious to combine Hou with Bastys to obtain the invention as specified in claim 4.

Hou et al. does not disclose isotropic, non-separable widows, filters, scaling functions and/or wavelets. This is abundantly clear from equations 15-17 of Hou et al. (page 73). The $H(\omega_1,\omega_2)$ and the $G(\omega_1,\omega_2)$ functions are not isotropic. Moreover, the scaling function $\varphi(\omega_1,\omega_2)$ and wavelet $\Psi(\omega_1,\omega_2)$ are not derivable from equations 10-12 using equations 16-17. Furthermore, the scaling function $\varphi(\omega_1,\omega_2)$ and wavelet $\Psi(\omega_1,\omega_2)$ are not non-separable and isotropic.

The present invention relates to the construction of isotropic filters, isotropic scaling functions and isotropic wavelets that can be used in frame multi-resolution applications and in any other application for which such filters are capable of being used.

Hou et al. did not actually create isotropic filters, isotropic scaling functions and/or isotropic

wavelets. Hou et al. did not even suggest a method for constructing isotropic filters, isotropic scaling functions or isotropic wavelets.

The inclusion of Bastys does not cure the deficiencies found in Hou et al. Moreover, Bastys disclosed shift-invariant and not rotationally invariant or isotropic. Shift invariance related to time shift of the x(t) to x(t-θ), while rotational invariance or isotropic behavior means that the function does not change when the function undergoes an arbitrary rotation about a central axis. Thus, the combination of Hou et al. and Bastys does not disclose or even suggest nonseparable isotropic filters, isotropic scaling functions or isotropic wavelets

Because the combination of Hou et al. and Bastys does not disclose isotropic filters, isotropic scaling functions or isotropic wavelets or how to construct isotropic filters, isotropic scaling functions or isotropic wavelets, this combination cannot render the present claims obvious. Applicants, therefore, respectfully request withdrawal of this rejection.

The Examiner contends as follows:

> Referring to claim 5, see the rejection of at least claim 2 above.

Applicants reassert their argument concerning the combination Hou et al. and Bastys. Applicants recognize that in all such application filters are designed – low, high and other types, but the Hou et al. and Bastys filters appear to be overlapping deconstructions and not non-overlapping. However, the basic problem with the Hou et al. and Bastys functions is that they are not nonseparable and isotropic. Applicants, therefore, respectfully request withdrawal of this rejection.

The Examiner contends as follows:

> Referring to claim 7, see the rejections of at least claims 1 and 4 above. Hou and Bastys do not explicitly disclose a system for processing signals implemented on a computer comprising a processing unit for performing the steps recited in claims 1 and 4. However, Official notice is taken that a computer comprising a processing unit for processing signals was exceedingly well known in the art. Therefore, it would have been obvious to modify Hou and Bastys to include a computer comprising a processing unit in order to enhance the speed and accuracy of the image processing technique.

Hou et al. does not disclose isotropic, non-separable widows, filters, scaling functions and/or wavelets. This is abundantly clear from equations 15-17 of Hou et al. (page 73). The $H(\omega_1,\omega_2)$ and the $G(\omega_1,\omega_2)$ functions are not isotropic. Moreover, the scaling function $\varphi(\omega_1,\omega_2)$ and wavelet $\Psi(\omega_1,\omega_2)$ are not derivable from equations 10-12 using equations 16-17. Furthermore, the scaling function $\varphi(\omega_1,\omega_2)$ and wavelet $\Psi(\omega_1,\omega_2)$ are not non-separable and isotropic.

The present invention relates to the construction of isotropic filters, isotropic scaling functions and isotropic wavelets that can be used in frame multi-resolution applications and in any other application for which such filters are capable of being used.

Hou et al. did not actually create isotropic filters, isotropic scaling functions and/or isotropic wavelets. Hou et al. did not even suggest a method for constructing isotropic filters, isotropic scaling functions or isotropic wavelets.

The inclusion of Bastys does not cure the deficiencies found in Hou et al. Moreover, Bastys disclosed shift-invariant and not rotationally invariant or isotropic. Shift invariance related to time shift of the x(t) to x(t-θ), while rotational invariance or isotropic behavior means that the function does not change when the function undergoes an arbitrary rotation about a central axis. Thus, the combination of Hou et al. and Bastys does not disclose or even suggest nonseparable isotropic filters, isotropic scaling functions or isotropic wavelets

Because the combination of Hou et al. and Bastys does not disclose isotropic filters, isotropic scaling functions or isotropic wavelets or how to construct isotropic filters, isotropic scaling functions or isotropic wavelets, this combination cannot render the present claims obvious. Applicants, therefore, respectfully request withdrawal of this rejection.

The Examiner contends as follows:

> Referring to claim 8, see the rejection of at least claim 2 above.

Applicants reassert their argument concerning the combination Hou et al. and Bastys. Applicants recognize that in all such application filters are designed – low, high and other types, but the Hou et al. and Bastys filters appear to be overlapping deconstructions and not non-overlapping. However, the basic problem with the Hou et al. and Bastys functions is that they are not nonseparable and isotropic. Applicants, therefore, respectfully request withdrawal of this rejection.

The Examiner contends as follows:

> Referring to claims 9-10, Hou does not explicitly disclose that each relative low pass component and each relative high pass component further comprises one relative low pass subcomponents and relative high pass subcomponents. However, Official notice is taken that each relative low pass component and each relative high pass component having relative low pass subcomponents and relative high pass subcomponents were exceedingly well known in the art for wavelength decomposition. Therefore, it would have been obvious to include these features in Hou and Bastys, in order to perform proper wavelength decomposition.

Hou et al. does not disclose isotropic, non-separable widows, filters, scaling functions and/or

wavelets. This is abundantly clear from equations 15-17 of Hou et al. (page 73). The $H(\omega_1,\omega_2)$ and the $G(\omega_1,\omega_2)$ functions are not isotropic. Moreover, the scaling function $\varphi(\omega_1,\omega_2)$ and wavelet $\Psi(\omega_1,\omega_2)$ are not derivable from equations 10-12 using equations 16-17. Furthermore, the scaling function $\varphi(\omega_1,\omega_2)$ and wavelet $\Psi(\omega_1,\omega_2)$ are not non-separable and isotropic.

The present invention relates to the construction of isotropic filters, isotropic scaling functions and isotropic wavelets that can be used in frame multi-resolution applications and in any other application for which such filters are capable of being used.

Hou et al. did not actually create isotropic filters, isotropic scaling functions and/or isotropic wavelets. Hou et al. did not even suggest a method for constructing isotropic filters, isotropic scaling functions or isotropic wavelets.

The inclusion of Bastys does not cure the deficiencies found in Hou et al. Moreover, Bastys disclosed shift-invariant and not rotationally invariant or isotropic. Shift invariance related to time shift of the x(t) to x(t-θ), while rotational invariance or isotropic behavior means that the function does not change when the function undergoes an arbitrary rotation about a central axis. Thus, the combination of Hou et al. and Bastys does not disclose or even suggest nonseparable isotropic filters, isotropic scaling functions or isotropic wavelets

Because the combination of Hou et al. and Bastys does not disclose isotropic filters, isotropic scaling functions or isotropic wavelets or how to construct isotropic filters, isotropic scaling functions or isotropic wavelets, this combination cannot render the present claims obvious. Applicants, therefore, respectfully request withdrawal of this rejection.

Having fully responded to the Examiner's Non-Final Office Action, Applicant respectfully urges that is application be passed onto allowance.

If it would be of assistance in resolving any issues in this application, the Examiner is kindly invited to contact applicant's attorney Robert W. Strozier at 713.977.7000

The Commissioner is authorized to charge or credit Deposit Account 501518 for any additional fees or overpayments.

Respectfully submitted,

Date: <u>October 3, 2008</u>

Robert W. Strozier, Reg. No. 34,024